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Green Open Space Design in Papan Island Township Arrangement

Muhammad Afiat [a,1], Luthfiah [b,2], Muhammad Bakri[c,1,*]

[a,b,c] Engineering Faculty, Tadulako University, Indonesia,
[1] bakri@untad.ac.id*
* corresponding author

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ABSTRACT

Introduction: The purpose of open space is as a forum for organizing activities that are not only limited to human activities but also as a forum for nature conservation Papan Island has the potential as a tourist destination with its cultural wealth and biodiversity, by creating a space for tourists and still paying attention to the needs of the people of Papan Island and its environment, a tourist area will be created with the concept of Green Open Space (RTH) **Method**: The method used in this research is the Architectural design method. This method uses an analysis of the activities and needs of tourists and the community on Papan Island. Data obtained through interviews, observations, documentation, and literature studies **Results and Discussion**: This research makes the concept of shared space in architecture refer to an area or environment designed to be used and enjoyed together by a group of people. Based on the results of the analysis that has been carried out, the following design response will be made, namely making flexible openings such as large sliding door openings but at the same time can be closed. **Conclusion** This research shows that green spaces can be a key element in creating a healthier, more comfortable, and sustainable environment on Papan Island:

1. Introduction

Indonesia has biodiversity and culture spread from Sabang to Merauke. This is illustrated on Papan Island in Kadoda Village, Talatako District, which is located in the Togean Islands National Park. Papan Island is a community that comes from various tribes, the majority of which are Bajo and Togian tribes. The people of Papan Island depend on their lives on the sea, including the place of residence that is adjacent to the sea. Activities side by side with the sea make the people of Papan Island unique and interesting to follow and have the potential as a cultural product that can bring in many tourists. Because the current government's focus is still only limited to natural beauty as a selling point, this has an impact on not maximizing the potential utilization of this cultural product.

The government through PP No. 50 of 2011 concerning RIPPARNAS 2010-2025 and Central Sulawesi Governor Regulation 35 of 2016 and RIPPARDA Tojo Una Una Regency mentioned that Papan Island in Kadoda Village in Talatako District, Togean Islands will be a Priority Tourism Destination (DPP). Papan Island has the potential as a tourist destination with its cultural wealth and biodiversity, by creating a space for tourists and still paying attention to the needs of the people of Papan Island and its environment, a tourist area will be created with the concept of Green Open Space.

2. Literature Review

2.1. Open Space

2.2.1 Definition of Open Space

According to Ibid, space is defined as a place or container for humans or other living things in order to carry out activities to sustain life in the world.

2.2.2 Purpose of Open Space

The purpose of open space is as a place to organize activities that are not only limited to human activities but also as a place for nature conservation.

2.2.3 Benefits of Open Space

Open Space is useful for an area to accommodate community or group activities outside the building. (Widyawati, Ernawati, and Puspita Dewi 2011)

2.2 Open Space Typology

According to (Edy Darmawan 2007) Public open space has a variety of forms and different shapes. The typology of planned urban space is influenced by human attitudes and behavior which is also influenced by technological developments. The facilities available in public spaces are increasingly developing the quality of design, materials, and maintenance.

2.3 Types of Public Open Space

Based on the regulation of the Minister of Public Works Number 12 of 2009, Public Open Space can be divided into two, namely:

A. Non-green Open Space
The form of RTNH is in the form of an area whose surface conditions are in the form of hardened enclosing elements or water bodies, as well as enclosures that cannot be overgrown or porous.

B. Non-green Open Space Facilities
1. Parking Lot
2. Sports Field
3. Plaza
4. Recreation Area
5. Corridor
6. Barrier

C. Non-Green Open Space Function
Non-Green Open Space (RTNH) can accommodate social, cultural, and community activities, such as bazaars, art festivals, culture, ceremonies, and others.

D. Green Open Space
Green open spaces are areas of land that are filled with plants and have uses for the environment, public welfare, and beauty.

E. Classification of Green Open Space
1. Forms of natural green spaces (wild/natural habitats, protected areas)
2. forms of non-natural or built green spaces (urban agriculture, urban planting, sports fields, cemeteries)

F. Function of green open space function

1. Main function
   a. Ensure that green spaces are part of the air circulation system.
   b. Rainwater absorption.

c. For shade.

2. Additional Functions
   a. Social and cultural functions
   b. economic function
   c. aesthetic function

Area Arrangement

2.4.1 Definition of Area Arrangement

Area Arrangement is one of the social engineering efforts organized in an area and is carried out in conjunction with efforts to create a comprehensive system related to activities that take place in the area, with due regard to environmental quality.

2.4.2 Purpose of Area Arrangement

A. Develop the social life of the local community.
B. Improve the local economy.
C. Developing environmental quality and preserving the environment.

2.4.3 Types of Area Arrangement

A. Arrangement of residential areas.
B. Tourism area arrangement.
C. Industrial estate arrangement.
D. Strategic area arrangement.
E. Arrangement of Agropolitan areas, and so on.

2.4.4 Principles of Area Arrangement

Basic Principles of Area Arrangement, namely:

A. Destination
   Develop the social life of the local community.
B. Scope
   Social system patterns.
C. Terms
   The suitability of the area's resources with the type of area to be developed.
D. Good planning
   Good zoning requires good planning, and the results of the planning must show that the recommended zoning ideas are guaranteed to succeed.

2.4.5 Structuring the Area with the Concept of Green Open Space

2.5 Comparative Study

A. Tebet Eco Park

Figure 1 Tebet Eco Park

Tebet Eco Park (TEP) is an urban park dedicated to the community and the environment. Located in South Jakarta with an area of 7.3 hectares, TEP is now present as a green open space that has been revitalized. Two park areas that were originally separate and opposite - Taman Tebet Utara and Taman Tebet Selatan, have now become one integrated park that carries the concept of harmonization between ecological, social, educational, and recreational functions.

3. Research Methods

The research location is on Papan Island, Tojo Una Una Regency, while the territorial area of Tojo Una Una Regency is directly adjacent to other territorial boundaries, such as:

A. The north is directly adjacent to Tomini Bay, Gorontalo Province, and also North Sulawesi Province.
B. To the south, it borders North Morowali Regency.
C. To the east, it is directly adjacent to Banggai Regency.
D. And the west borders Poso Regency.

3.1 Type of Research

The method used in this research is the Architectural design method. The method uses an analysis of the activities and needs of tourists and the community on Papan Island. Data data obtained through interviews, observations, documentation, and literature studies.

3.2 Research Data Source

A. Primary data is obtained through direct observation in the field in the form of visual data documentation and also the results of oral and written interviews.
B. Secondary data is data obtained through literature relevant to the research and also valid documents relevant to the research being carried out.

Table 1

No.	Data Type	Data Collection Methods	Instrument
1.	Primary Data		
	• Vegetation Around the Site • Site Accessibility • Site Utilities • Site Topography • Interview with respondents	Observation	• Camera • Stationery
	• Images of Existing Conditions and Infrastructure	Documentation	
2.	Secondary Data		
	• Research Object Literature (Definition, Function)	Via the Web (Internet)	Computer/Devices
	• Architectural Design Principles	Reading References	Stationery

[a.] Data Collection Technique

Table 2

NO.	Tools	Usability
1.	Digital Camera	Taking Pictures of Surveyed Site Conditions
2.	Writing and Drawing Tools	Record Survey Results and Make Sketches
3.	Map	Describe Site Analysis and Location

[b.] Use of Research Tools

3.3 Research Instruments

Tools and materials used in the data collection process, namely:

A. The interview draft is a list of questions that are used as guidelines when conducting interviews with each selected sample.
B. Sketches, drawings, or photographs to supplement data and analysis.

3.4 Data Collection Technique

A. Observation Technique
B. Interview Technique
C. Documentation Technique
D. Literature Study

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3.5 Flow of Thought

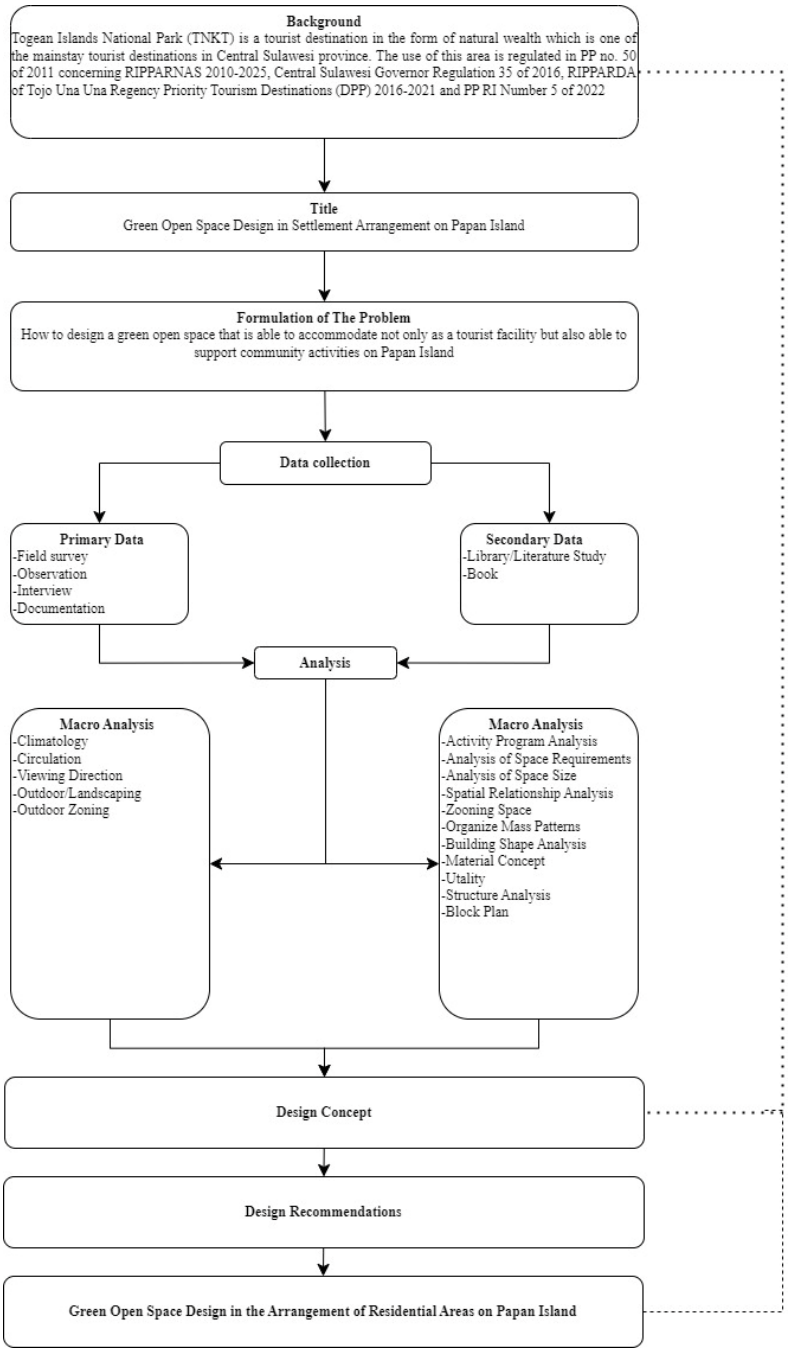

Figure 2

4. Results and Discussion

4.1. Overview

A. Geographical Location

Figure 3 Map of Papan Island

Papan Island is geographically located in the Togean Islands National Park, Tojo Una Una Regency with the following administrative boundaries:

1. The north is bordered by 2 hamlets of Kadoda village.
2. The west borders the sea.
3. The south borders the sea.
4. The east is bordered by Malenge Island.

B. Demographic Conditions

According to the Population Census data from the Central Bureau of Statistics of Tojo Una-Una Regency, in 2021 the population of Kadoda Village totaled 621 people. Currently, the main livelihood of the community is farming with the sub-sector livelihood being fishing.

C. Tourism Potential in Pulau Papan

1. Water Tourism

The Togean Islands are one of the coral triangle regions.

No.	Year	Average Undercover (%)
(1)	(2)	(3)
1	2010	22,27 - 67,6
2	2011	19,5 - 66,4
3	2012	19,11 - 67,51
4	2013	19,24 - 67,51
5	2015	23,32 - 59,0

Figure 4

2. Bajo Tribe Settlement

The Bajo tribe is a tribe that lives side by side with water. on the plank island, their houses are on the surface of the water and on land. The activities of the Bajo tribe as a tribe that coexists with water produce and become an interesting culture to watch.

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Figure 5 Welcoming Dance of the People of Pulau Papan

Figure 6 Mat Making in Pulau Papan Community

4.2. Topak Analysis

A. Site Design Reference
   1. The Togean Islands are among the 50 National Tourism Destinations regulated in Government Regulation No. 50 of 2011 concerning RIPPARNAS 2010-2025.
   2. Government Regulation No. 5 of 2022 on the ZONATION PLAN OF THE TOMINI TELUK ANTARWILLE AREA in CHAPTER V of the MARINE SPACE POLA PLAN as a tourism designation.

B. Access to the Site

   Access to the site uses water transportation modes, namely boats and boats with varying dimensions and travel times.

Figure 7 Transportation to Papan Island

C. Site Area and Dimensions

   The site is adjacent to the Pulau Papan community settlement with a total area of ± 1.17 hectares. The dimensions of the site with the longest point are 216 meters and the wide point is 191 meters as shown in Figure 31.

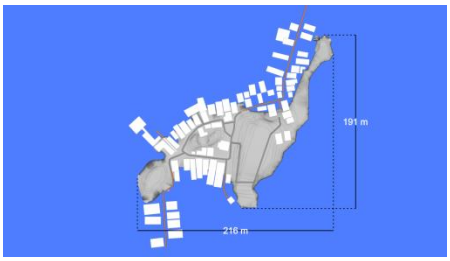

Figure 8 Site Area

D. Site Condition
   1. The soil structure is dominated by coral with varied contours and a highest point of 16 meters.
   2. Tropical climate 1200-4100 mm/year, temperature 17-33°C, humidity between 74% - 82% and wind speed between 3-6 knots.
   3. The site is adjacent to the settlement of the Plank Island community which consists of various tribes such as Kaili, togian, Bugis, and Gorontalo which is dominated by the Bajo tribe.

E. Facility Condition

Figure 9 Site Facilities

F. Concept of Open Space Design on Papan Island as a Shared Space (Space Sharing Concept)
   The concept of shared space in architecture refers to an area or environment designed to be used and enjoyed together by a group of people.

4.3. Micro Analysis

4.3.1. Function Analysis

Green Open Space on Pulau Papan is a facility that accommodates:

A. Travel
B. Local Cultural Expression Space
C. Gardening Room

4.3.2. Activity Program Analysis

A. Destination
   To get the pattern of activities in the Green Open Space.
B. Basis for Consideration
   Activity groups are adapted to the Green Open Space Function for tourism activities, local expression spaces, and gardening spaces.
C. Analysis
   1. Travelers
      a. Watching the show
      b. Stay
      c. Buying souvenirs
   2. Community
      a. Gardening
      b. Organizing performances
      c. Cooking

4.3.3. Activity Performer Analysis

A. Destination
To determine the activity patterns of actors.

B. Rationale:
Actors are determined based on the function of the Green Open Space for tourism and the daily activities of the community.

1. Travelers

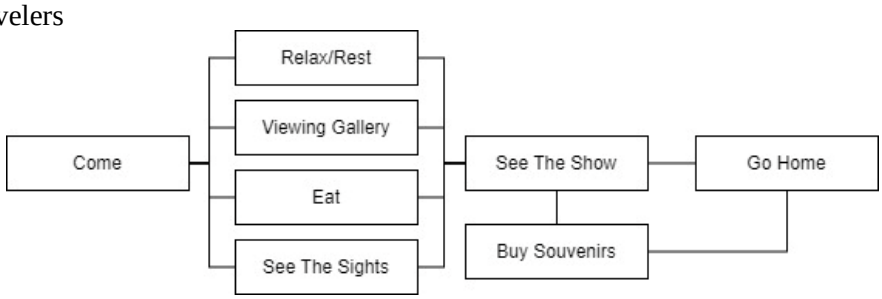

Figure 10 Non-staying Tourist Activity Chart

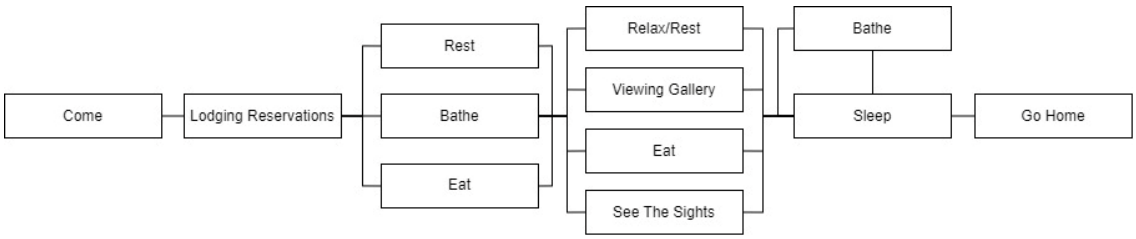

Figure 11 Staying Tourist Activity Chart

2. People of Pulau Papan

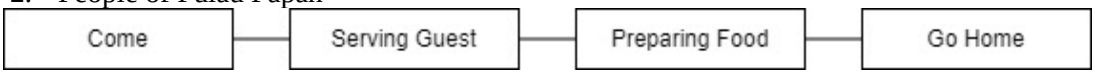

Figure 12 Activity Chart of Restaurant Manager of Pulau Papan Community

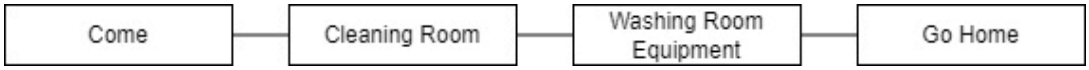

Figure 13 Activity Chart of the Island Community Hospitalization Room Manager

4.3.4. Space Requirement Analysis

Aims to determine the availability of space based on activities on the site

Table 3

Performers	Activities	Space Requirement	Nature of Space
Travelers	Sleep/Stay	Hospitalization Room	Semi-Public
	Relax	Caffe / Home	Public
	Watching the Show	Amphitheater	Public
	Buying Crafts	Souvenir Shop	Public
	Viewing the scenery	View Tower	Public
	Viewing the Exhibition	Gallery	Public
	Wastewater	Toilet	Service
	Bathing	Bathroom	Service

	Planting crops	Canopy	Public
	Caring for Plants	Canopy	Public
	Watching the Show	Amphitheater	Public
	Deliberation	Multipurpose Area	Public
People of Pulau Papan	Preparing Food	Kitchen and Mini Caffe	Service
	Caring for Plants	Canopy	Public
	Washing Clothes	Laundry Room	Service
	Selling Souvenirs	Souvenir Shop	Public
	Set up	Amphitheater	Public

[c.] Activity Analysis

A. According to the book Architect's Data by Ernest Neufert, 1 person is 0.62 m.
B. Table 4 Space circulation standards by Joseph de Chiara & John Callender

Percentage	Information
5 – 10%	Minimum Standards
20%	The Need For Wide Circulation
30%	Physical Comfort Needs
40%	Psychological Comfort Demands
50%	Activity Specific Demands
70 – 100%	Description With Many Activities

Figure 14

4.3.5. Calculation of Space Size

A. Objective:
Get the amount of space according to the activity designation.
B. Rationale:
Referring to the analysis of the amount of space previously described.

No.	Room	Amount	Capacity	Capacity	Source	Area (m2)
Tourist Lodging Room						
1.	Bedroom	10	2 Persons	11,15 m2	Architect Data	144.95
2.	Bathroom & Toilet	10	1 Persons	2,25 m2 + 20%	Architect Data	27 m2
3.	Home Page	10	4 Persons	(0,62) m2 30%	TSB	68.14 m2
Communal and Recreational Areas						
1.	Amphitheater Seating Area	1	100 Persons	(0,62)+Flow 30%	Architect Data	80.6 m2
2.	Performance Area	1	20 Persons	(0,62)+Flow 70%	Architect Data	21.08 m2
3.	Meeting Area	1	50 Persons	(0,62)+Flow 30%	Architect Data	40.2 m2
4.	Gallery	1	50 Persons	(1,5 m2)+Flow 30%	NAD	97.5 m2
5.	Café	1	20 Persons	(12,5 m2)+Flow 30%	NAD	325 m2
6.	Viewing Tower	1	50 Persons	(0,62 m2)+Flow 30%	AP	16.12 m2
7.	Kitchen	1	5 Persons	(5 m2)+Flow 30%	NAD	25 m2
8.	Baristas	1	8 Persons	(1,5 m2)+Flow 30%	NAD	15.6 m2
9.	Souvenir Shop	1	15 Persons	(3 m2)+Flow 30%	NAD	58.5 m2
10	Laundry	1	8 Persons	(6 m2)+Flow 30%	NAD	62.4 m2
Gardening Area						
1.	Canopy	30		- 1.5 m (The width of the road) - +30 cm (Vegetable Plant Pot Dimensions)	Buleleng Regency Environmental Service	54 cm2

Figure 15

Space Requirements		Wide
1.	Tourist Lodging Room	240.09 m2
2.	Communal and Recreational Areas	742.1 m2
3.	Gardening Area	54 m2
	Total	1036.19 m2

Figure 16

The built design is 1036.19 sq m or 0.10 Ha.

4.3.6. Space Relationship Analysis

A. Destination
With the aim of achieving an integrated space.

B. Rationale:
1. Type of Activity
2. Space relationship

3. Activity actors

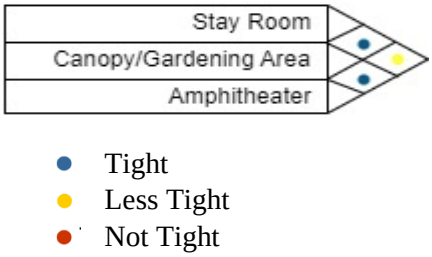

Figure 17 Relationship between Major Facilities

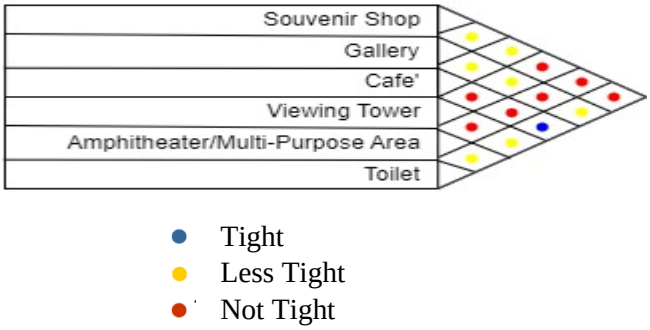

Figure 18 Relationship between Support Facilities

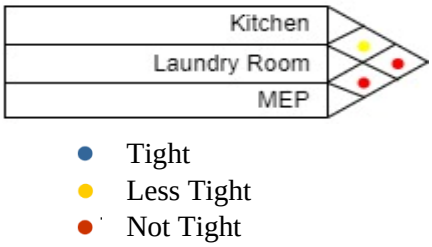

Figure 19 Relationship between Management Facilities

4.3.7. Building Form Analysis

Building form analysis aims to process the shape of the building. The shape of the building adopts the shape of the bajo house around the site, this aims to make the building able to blend in with the existing existence.

Figure 20 House Shape in Pulau Papan

The simple form of some parts of the building can still be explored by paying attention to the function of the building part or the overall function of the building.

4.3.8. Material Concept

Selecting the right material, according to the needs of the building designation with the following considerations:

A. Existing Condition
B. Climate
C. Security
D. Comfort

Figure 21 Material Use in Houses on Papan Island

The use of materials will avoid metal-based materials because they are prone to corrosion. the selection of materials in buildings using natural materials in addition to being resistant to site conditions is also to maintain locality and facilitate community access to available materials.

4.3.9. Utilas System Analysis

A. Clean Water

Figure 22 Illustration of Clean Water Source

B. Electricity

Figure 23 Illustration of Power Source

C. Waste System

Figure 24 Illustration of Waste Management System

D. Fire Extinguishing System

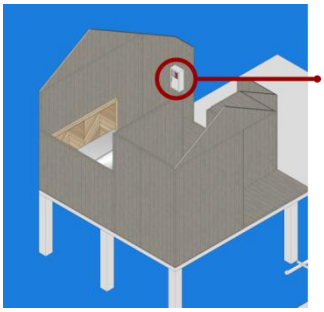

Figure 25 Placement of Handheld Fire Extinguisher

E. Sewage/Dirty Water Treatment

Figure 26 Illustration of Liquid Sewage Treatment

Figure 27 Illustration of Solid Waste Treatment

4.3.10. Structure Analysis

Aims to find the right structural system in accordance with site conditions. the basis for considering the selection of structures, namely:

A. Site position
B. Contours
C. State of the neighborhood

The following are the conditions on the site:

A. The environmental conditions of the site are on the coast.
B. The site is on a rock face with little soil.

Here is the structural system to be used: Here is the structural system to be used:

A. Stage Model Building.

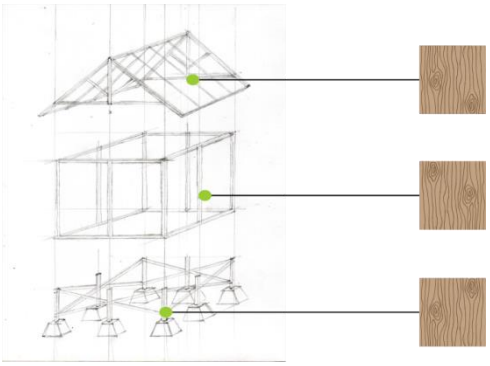

Figure 28 Use of Umpak Type Structure System

B. Multi-storey Buildings

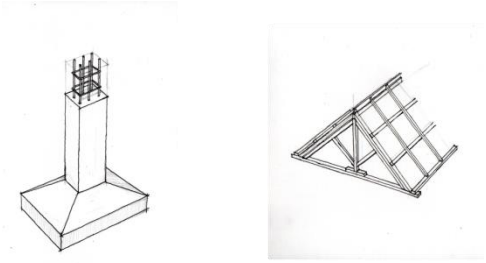

Figure 29 Use of the structural system in facilities with large capacity

4.4. Macro Analysis

4.4.1. Site Zoning

Aims to divide the zones on the site based on their nature consisting of Public, Semi-Public, semi-private, and service zones.

The zoning considerations are as follows:

A. Nature of activities on the site
B. Site activities
C. Site condition
D. Viewpoint of the site

The Green Open Space Design in the Arrangement of the Papan Island Area based on the nature of the activity consists of 3 zones, namely the public zone, semi-public zone, and service zone.

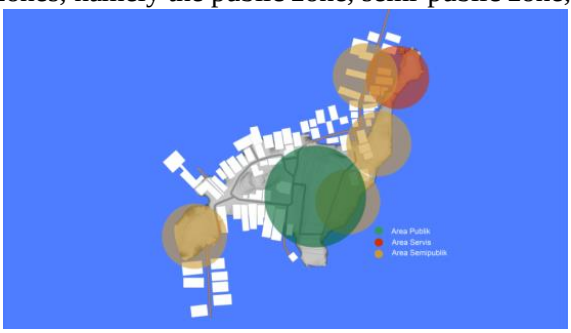

Figure 30 Division of Area on the Site

4.4.2. Climatological Analysis

A. The Sun

Analyzing the effect of the sun on the site. with basic considerations:

1. Solar intensity on the site.
2. Solar orientation of the site.

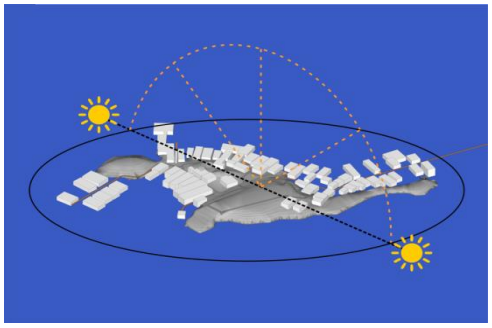

Figure 31 Sun Circulation Line

Based on the circular line of the sun and the position of the site which is almost parallel to the equator, the site is perfectly illuminated by the sun, from morning to evening.

Then the following design response is required.

1. Planting vegetation is a response to site conditions because vegetation can reduce temperature.

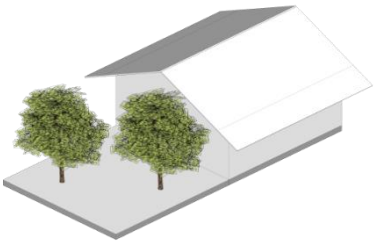

Figure 32 Illustration of Vegetation on the Site

2. Building over stacks, utilizing building over stacks to reduce heat entering the building.

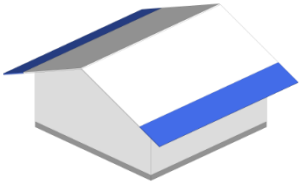

Figure 33 Illustration of Building Overstake

3. The use of shading in the form of secondary skin reduces the heat entering the building.

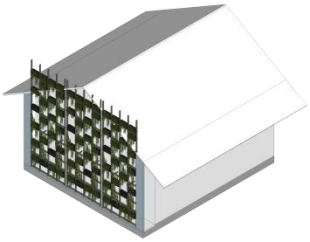

Figure 34 Illustration of Secondary Skin on Building

B. Wind

Aims to analyze the effect of wind on the site and its environment in order to get an architectural solution to the problem on a considered basis:

1. Wind direction towards the site
2. Existing
3. Comfort

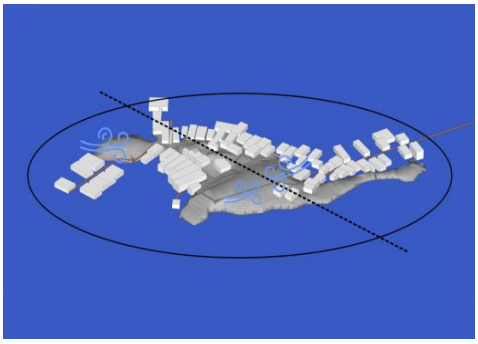

Figure 35 Wind Direction on the Site

The wind direction on the site generally blows from the north and south, the wind is quite strong because there is no natural barrier to reduce wind speed.

So at certain points, buffers are placed in the form of vegetation as a breaker and direction of the wind.

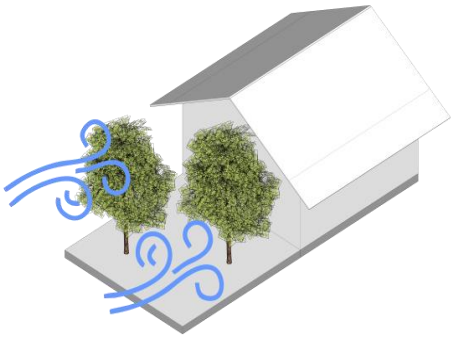

Figure 36 Illustration of Trees as Wind Breakers

4.3.3. Circulation Analysis on the Site

Aim to plan for good, convenient, and safe circulation, based on considerations:

A. Site condition
B. Site position
C. Site climate
D. Security
E. Comfort

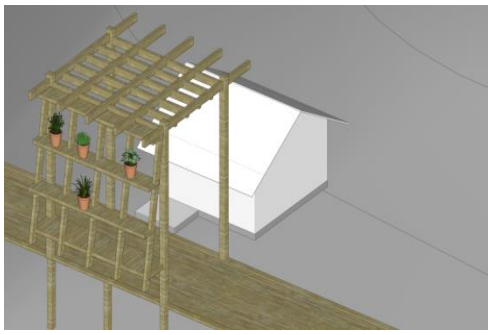

Figure 37 Design Response to the Site

4.4.4. Viewing Direction Analysis

This analysis aims to maximize the potential of the viewing direction on the site by considering:

A. Wind and sun conditions.
B. Existing, dimensions.
C. Potentially the best viewing direction.

Based on the results of the analysis that has been carried out, the following is the design response that will be made, namely making flexible openings such as large sliding door openings at the same time can be closed.

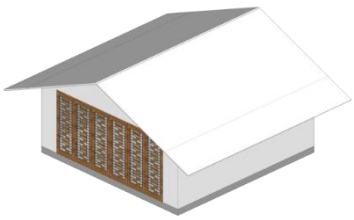

Figure 38 Sliding Door When Closed

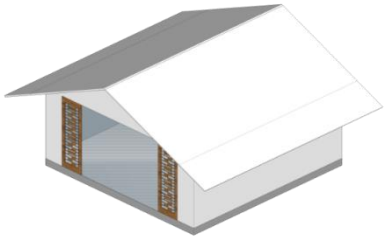

Figure 39 Sliding Door When Opened

4.4.5. Vegetation and Outdoor Layout Analysis

A. Softscape

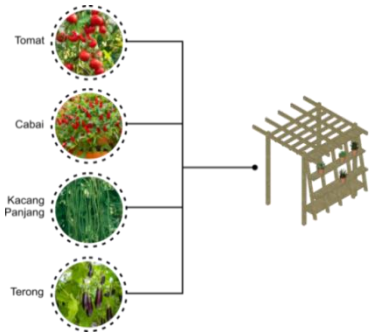

Figure 40 Selection of Plants in the Canopy

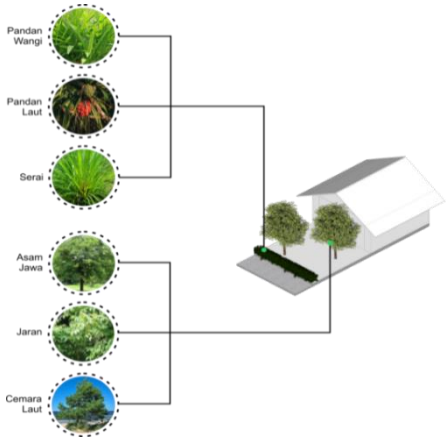

Figure 41 Tree and Shrub Type Plant Selection

B. Hardscape
   1. Benches and trash cans
   2. Gravel

4.4.6. Lighting Analysis

A. Outdoor Lighting

For use in outdoor areas such as on circulation paths, garden parks will use toro.

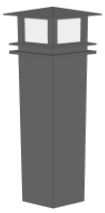

Figure 42

B. Indoor Lighting

Figure 43 Petromax as a variation of indoor lighting source

Figure 44 Lamp as a Variation of Indoor Lighting Source

5. Conclusion

The research "Green Open Space Design in the Arrangement of Pulau Papan Area" focuses on the importance of developing and arranging green open spaces (RTH) in improving the quality of the environment and life in Pulau Papan. The study identified the need for green spaces as a solution to address environmental issues, such as air pollution and land degradation, as well as providing recreational and aesthetic spaces for local residents. The research emphasizes that green spaces are not just decorative elements, but also serve as natural air filters, habitats for biodiversity, and water catchment areas that can reduce the risk of flooding.

The design of the green spaces proposed in this research considers various aspects, including the selection of plants that are suitable for the local climate and soil conditions, and a layout that supports social interaction and community activities. The research also highlights the importance of community participation in the planning and management process of green spaces to ensure long-term sustainability and success. By integrating green spaces in spatial planning, this research shows that green spaces can be a key element in creating a healthier, more comfortable, and sustainable environment in Pulau Papan.

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